

TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

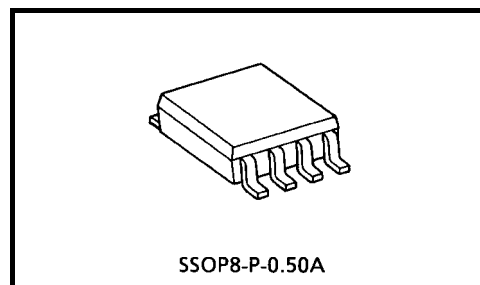
TC7WB125FK

Dual Bus Switch

The TC7WB125FK is a low on-resistance, high-speed CMOS 2-bit bus switch. This bus switch allows the connections or disconnections to be made with minimal propagation delay while maintaining Low power dissipation which is the feature of CMOS.

When output enable (\overline{OE}) is at low level, the switch is on; when at high level, the switch is off.

All inputs are equipped with protector circuits to protect the device from static discharge.

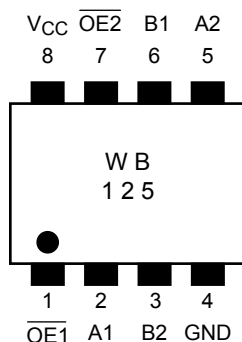


Weight: 0.01 g (typ.)

Features

- Operating voltage: $V_{CC} = 4.5 \sim 5.5 \text{ V}$
- High speed operation: $t_{pd} = 0.25 \text{ ns (max)}$
- Ultra-low on resistance: $R_{ON} = 5 \Omega \text{ (typ.)}$
- ESD performance: Machine model $\geq \pm 200 \text{ V}$
Human body model $\geq \pm 2000 \text{ V}$
- TTL level input (control input)
- Package: US8

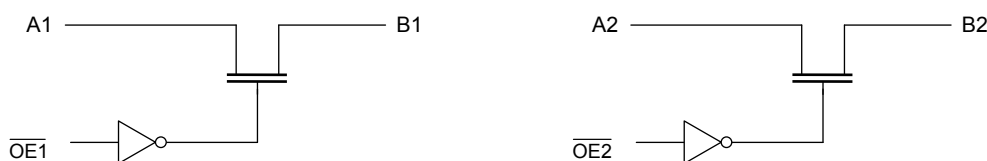
Pin Assignment (top view)



Truth Table

Inputs	Function
$\overline{\text{OE}}$	
L	A port = B port
H	Disconnect

System Diagram



Absolute Maximum Ratings (Note)

Characteristics	Symbol	Rating	Unit
Power supply voltage	V_{CC}	-0.5~7.0	V
Control pin input voltage	V_{IN}	-0.5~7.0	V
Switch terminal I/O voltage	V_S	-0.5~7.0	V
Clump diode current	I_{IK}	-50	mA
Switch I/O current	I_S	128	mA
Power dissipation	P_D	200	mW
DC V_{CC}/GND current	I_{CC}/I_{GND}	± 100	mA
Storage temperature	T_{stg}	-65~150	$^{\circ}\text{C}$

Note: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.

Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Operating Ranges (Note)

Characteristics	Symbol	Rating	Unit
Power supply voltage	V_{CC}	4.5~5.5	V
Control pin input voltage	V_{IN}	0~5.5	V
Switch I/O voltage	V_S	0~5.5	V
Operating temperature	T_{opr}	-40~85	$^{\circ}\text{C}$
Control pin input rise/fall time	dt/dv	0~10	ns/V

Note: The operating ranges must be maintained to ensure the normal operation of the device.
Unused inputs must be tied to either V_{CC} or GND.

Electrical Characteristics

DC Characteristics (Ta = -40~85°C)

Characteristics		Symbol	Test Condition		Min	Typ. (Note 1)	Max	Unit
				V _{CC} (V)				
Control pin input voltage	"H" level	V _{IH}	—	4.5~5.5	2.0	—	—	V
	"L" level	V _{IL}	—	4.5~5.5	—	—	0.8	
Input leakage current		I _{IN}	V _{IN} = 0~5.5 V	4.5~5.5	—	—	±1.0	μA
Power off leakage current		I _{OFF}	A, B, \overline{OE} = 0~5.5 V	0	—	—	±1.0	μA
Off-state leakage current (switch off)		I _{SZ}	A, B = 0~5.5 V, \overline{OE} = V _{CC}	4.5~5.5	—	—	±1.0	μA
ON resistance (Note 2)		R _{ON}	V _{IS} = 0 V	I _{IS} = 64 mA	4.5	—	5	Ω
				I _{IS} = 30 mA	4.5	—	5	
			V _{IS} = 2.4 V, I _{IS} = 15 mA		4.5	—	10	
Quiescent supply current		I _{CC}	V _{IN} = V _{CC} or GND I _{OUT} = 0	5.5	—	—	10	μA
		ΔI _{CC}	V _{IN} = 3.4 V (one input)	5.5	—	—	2.5	mA

Note1: The typical values are at V_{CC} = 5 V, Ta = 25°C.

Note2: Apply the specified current to the switch, then measure the voltages on pins A and B. The on-resistance is the lower of the two.

AC Characteristics (Ta = -40~85°C)

Characteristics	Symbol	Test Condition		Min	Max	Unit
			V _{CC} (V)			
Propagation delay time (bus to bus)	t _{pLH} t _{pHL}	Figure 1, Figure 2	(Note) 4.5	—	0.25	ns
Output enable time	t _{pZL} t _{pZH}	Figure 1, Figure 3	4.5	—	4.0	ns
Output disable time	t _{pLZ} t _{pHZ}	Figure 1, Figure 3	4.5	—	5.0	ns

Note: The propagation delay time is calculated by the RC (on-resistance and load capacitance) time constant.

Capacitive Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition		Typ.	Unit
				V _{CC} (V)		
Control pin input capacitance		C _{IN}	(Note)	5.0	3	pF
Switch terminal capacitance		C _{I/O}	\overline{OE} = V _{CC} (Note)	5.0	10	pF

Note: This item is guaranteed by design.

Switch

- Open
- 7.0 V
- GND

Output

Measure

$C_L = 50 \text{ pF}$
 $R_L = 500 \Omega$

Parameter	Switch
t_{pLH} , t_{pHL}	Open
t_{pLZ} , t_{pZL}	7.0 V
t_{pHZ} , t_{pZH}	Open

AC Waveform

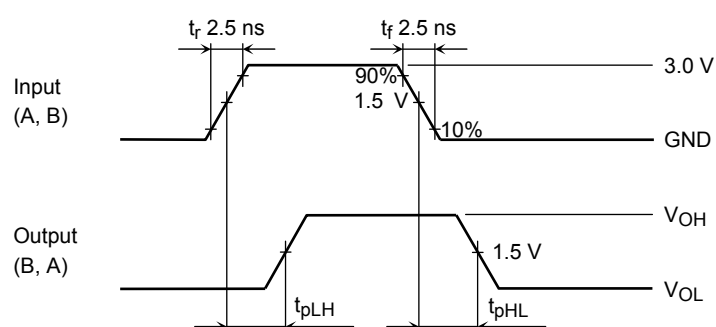


Figure 2 t_{pLH} , t_{pHL}

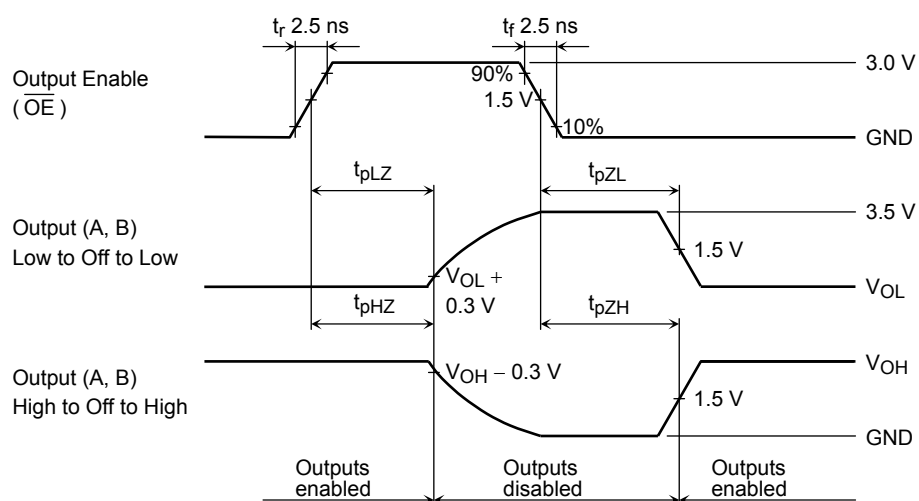
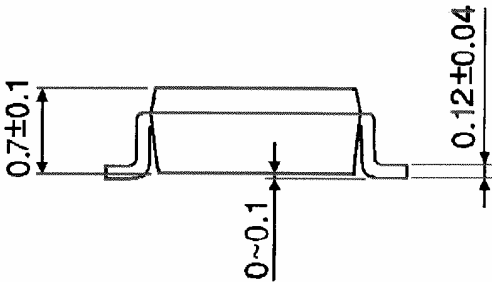
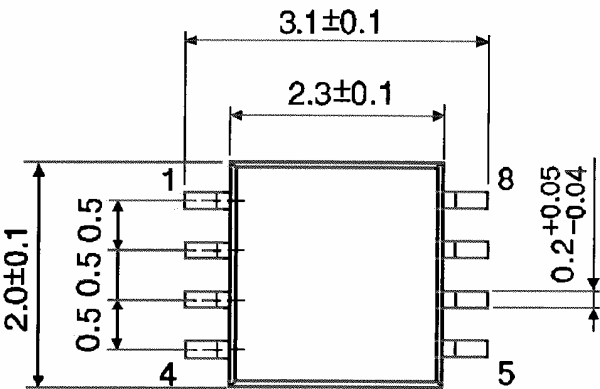


Figure 3 t_{pLZ} , t_{pHZ} , t_{pZL} , t_{pZH}

Package Dimensions

SSOP8-P-0.50A

Unit : mm



Weight: 0.01 g (typ.)

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20070701-EN GENERAL

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